

**MULTI-DEVICE MACHINE FOR TREATING THREAD BEFORE WEAVING, APPLYING A
 PROVISIONAL MECHANICAL TREATMENT**

OBJECT OF THE INVENTION

The object of the present invention is related to a multi-device false-twist machine,
 5 especially designed for on-line preparation of thread (by false-twisting), just before
 entering the needle/s of all types of loops, knitting machines, etc. of technical and textile
 threads.

Said machine is especially designed in order to house several false-twister
 devices, where each device makes the thread or threads that pass through said device
 10 twist provisionally because of the effect of the false-twisting of a set number of
 rotations/meter on its path to the needle of what may be a loom, a knitting machine, etc.

By thus effecting the false-twist in this way the regularity of the thread is increased,
 avoiding many problems later in the final destination (loom, knitting machine, etc.),
 since loosenings are not formed, which cause breakage problems in the thread/s and the
 15 needle/s, as well as a lack of quality in the final product.

BACKGROUND OF THE INVENTION

At present, the warp threads that feed needle knitting machines and looms present
 a number of limitations when sending through each thread or group of threads joined by
 the hole of its respective needle. Said thread or joined group of threads may be twisted
 20 or not depending on the effect desired in the final fabric, and upon passing through the
 respective needle there is a high probability that the thread/s and/or corresponding
 needle should break due to the friction among the thread/s and needle due to the
 existence in said thread/s of a knot caused by the difference in unitary tensions in the
 case of groups of joined threads, or also due to the existence of certain irregularities in the
 25 thread/s itself/themselves such as loosenings, loops, etc.

This phenomenon makes the production efficiency of said machines very low due to
 the operator's stopping the loom and provoked by said phenomenon, the application of

previous corrective measures being habitual in order to present said problems as far as possible, centred in checking that the prime materials that are fed into said machines are produced with previous twisting operations and in good conditions of regularity, without knots, loosenings, etc.

5 The multi-device false-twisting machine re-structures the present carpet or fabric production process, since the operation of creating false-twisting is added "on-line" to the general fabric production process, inserted before the needles of the need1e machine, whether the latter is a loom or a need1e knitting machine, which does not lengthen the carpet or fabric production process in spite of being an additional operation.

10 In cases such as the production of fabrics in which, at present, pre-twisting of the thread is only carried out as a preventive measure in order to increase the regularity of the thread/s, and as a consequence the efficiency in the need1e loom, needle knitting machine or need1e braiding machine, in an improved acceptance of the thread/s passing through its
15 respective holes, the process of pre-twisting can be eliminated by installing the multi-device false-twisting machine on-line before the thread enters the needles or the need1e knitting machine.

20 **DESCRIPTION OF THE INVENTION**

The multi-device false-twisting machine is composed of a fixed frame that may include adjustable parts, on which the false-twisting devices are mounted (as is already known in the market), in a varying number depending on the number of threads that the loom or
25 knitting machine has

On knitting machines with one hole, the machine has one device, and up to 1.500 devices on needle looms. Said machine is disposed so that the devices may be located at a distance and with the appropriate orientation in relation to the needles of the loom or knitting
30 machine, with the objective that the threads proceeding from the spools of the input creel, before arriving at the needles, should pass through the devices and the false-twisting effect produced by the devices should reach the needles of the loom or knitting machine.

In the multi-device machine of the invention, each false-twisting device is provided with an activation system, whether pneumatic by electrovalves, electro-mechanical, with an electric motor and mechanical transmission, or others, depending on the type of device applied among those known in the market. In any case, said devices generate a false-twist
 5 on each of the thread/s that pass through said respective false-twisting device.

A false-twisting device is an apparatus that, essentially, has a point at which the thread is sent into the device and a point at which the thread comes out of said device, as well as an intermediate zone between the two aforementioned points at which the thread is
 10 rotated with respect to its own lengthwise axis in one or another rotation direction depending how it is activated. The multi-device machine of the invention allows the installation of false-twisting devices of any of the types known in the state of the art, and in it, the number of rotations per unit of time generated on the thread, the direction of rotation of said thread and the duration of rotation movement generated are the parameters whose values are set
 15 before starting the warp production operation. The combination of the values of said parameters is controlled and directed by a central unit by a working program and said combination of values is specific depending on the calibre and type of thread or threads to be processed.

The distance from the set point, within the zone in which the thread is rotated, that is, where the false-twist is generated before the thread enters the loom, up to the respective
 20 need1e of the loom or knitting machine can also be adjusted and the direction of the thread oriented depending on each different product to 5 be processed, with the purpose of the threads having, just before entering the needle, the necessary number of twists to present
 25 loosenings or loops and so that they may pass through said needles without any trouble. Although generally, once said distance and orientation is set it may be maintained as in the majority of threads it is already correct.

BRIEF DESCRIPTION OF THE DRAWINGS

In order to provide an improved understanding of the present invention a practical preferred embodiment of the object of the present invention is included below, based on the attached figures.

Figure 1: View of the multi-device false-twisting machine mounted on a "TUFTING" needle loom

Figure 2: Front view of the multi-device false-twisting machine mounted on a "TUFTING" needle loom.

10 PREFERRED EMBODIMENT OF THE INVENTION

The preferred embodiment disclosed below should be understood as just one of the many which, as an application of the present invention, may be put into practice, taking into account that the type of false-twisting device is not an essential part of the invention and any type of said device known in the art may be used in any practical embodiment of the machine of the invention.

The essential object of the invention being to generate twists in the thread or threads, whether one or several and already twisted or not, proceeding from an input creel of the loom, at an intermediate point between said creel and the needle (8) of the loom or knitting machine so that as soon as said thread/s make contact with said needle (8) it is provided with a set number of twists per meter, thus by such an effect providing the thread with greater regularity and roundness, therefore preventing breakage problems due to the formation of loosenings, loops or other causes derived from insufficient twisting.

The thread (1) proceeding from the input creel are sent to the frame (3) on which the false-twisting devices (4) being used are mounted, from among the different types known in the art, activated by their activation system. In this embodiment, the devices are mechanical rollers that are activated simultaneously by a belt (6) proceeding from an electrical, mechanical, pneumatic, etc. motor, among those known can be used to put the invention in practice. Similarly, it may or may not be necessary to use one or more thread direction change rollers (2) depending on the distance and orientation chosen for each product.

The threads enter and cross through the respective devices, which produces the twists in the thread/s, said twists being made in a set direction and on the portion of thread between the device (4) and the roller (2) (or between the device (4) and the input creel when rollers are not being used) and in the opposite direction on the portion of thread between the device (4) and the needle (8). The number of twists per unit of length that the thread carries at the time it enters into the needle (8) depends on: the relative position of the devices (4) with respect to the roller (2) positions and the needle (8), the quantity and calibre of the threads to be sent through a single needle and whether said threads are twisted amongst themselves, the degree of false-twist generated by the device (4), the input speed of the warp thread generated by the loom, the cycle of rotation movements generated by the device (4) and the sequence of rotation movements and stops, if set, of each cycle, all of which is determined and programmed depending on the characteristics and needs of the thread to be processed.

The activation motor (5) is provided with a conventional thread control system with regards to the degree and direction of the false-twist. A general program sets the variables of speed and thread rotation, including the specific movement sequence and the work cycle for each specific type of thread to be processed.

It is important to note that the essential characteristic of the multi-device false twisting machine is that it is mounted on-line within the main machine, that the operation of the devices is carried out as just one of the series of operations of said main machine, and that the operation of the devices does not in any way condition the thread processing speed in the needle loom, the needle knitting machine, etc., although it does increase the efficiency of the functioning of said weaver, knitting machine, etc.